

Overview of AIRS Validation

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AIRS Science Team Meeting
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Today's Talk

- The Launch+1 year Validation Report to accompany public release of Level 2 data
- Some validation results for inclusion in the Validation Report.

Brief Status of Validation Data Sets

- We have observations from 1200 Aqua overpasses in JPL system (as of 2/21).
- These will be described in more detail by Validation Team members

Validation Report Delivery to DAAC on June 6

- *AIRS Validation*: Comparison with correlative data sets with known error characteristics AND a physically-based retrieval
- Focus on oceanic cases in this report
 - Next report (in the fall) will include land cases.

Some Milestones for June Delivery

March 13-26:	V3.0 processing of validation data sets
<i>April 4:</i>	<i>First draft document with figures / placeholders</i>
<i>April 24:</i>	<i>NetMeeting to discuss draft</i>
<i>May 9:</i>	<i>Final updates</i>
May 13:	Ship v3.0 to DAAC.
<i>May 23:</i>	<i>Publication as JPL document.</i>
June 11:	Public release of v3.0 Level 2 at DAAC.

Many past presentations to be incorporated into report.

Validation Report Responsibilities

- Simulation Results
 - **J. Susskind** Provide analyses for a post-launch focus day for simulation data sets, as was done for the simulation data sets prior to launch.
- Case Study
 - **E. Fetzer** Chesapeake Platform, 13 Sep
- Forward Model
 - **L. Strow** Estimates of forward model uncertainties.
- L1B Microwave
 - **P. Rosenkranz / D. Staelin** Microwave Obs-Calc with radiosondes
- L1B Infrared
 - **B. Smith / H. Revercomb** Comparison with aircraft observations.
 - **L. Chen** (Obs - NCEP.calc) ± 40 degree latitude
 - **L. Strow** (Obs - ECMWF.calc) ± 40 degree latitude
 - **D. Hagan** Obs - RTA-corrected TOA, clear drifting buoys
 - **D. Tobin / V. Walden** Dome Concordia comparison
- L1B Vis/NIR
 - **C. Gautier** Railroad Playa, UCSB comparison

Validation Report Responsibilities (Cont'd)

- Cloud-Clear Radiances
 - **J. Susskind / E. Fishbein** Comparison vs. cloud fraction
- Sea Surface Temperature
 - **D. Hagan** AIRS - buoys vs. cloud fraction and moisture
 - **J. Susskind** AIRS - ECMWF vs. cloud fraction
- Temperature Profiles
 - **E. Fetzer** Comparison with dedicated sondes (ocean only).
 - **E. Olsen** Comparison with PREPQC sondes (ocean only).
- Water Vapor
 - **L. McMillin** Comparison with dedicated sondes (ocean only).
 - **L. McMillin / J. Yoe** Comparison with GPS network?
- Ozone
 - **B. Irion** Comparison with TOMS and ozonesondes

Deferred Validation Report Activities

- Land
 - Land Surface Temperature
 - Temperature and Humidity over Land
- Cloud Properties
 - May require cross-comparison with MODIS, or, in situ observations (e. g. CAMEX 5).

What about upper tropospheric humidity?

The AIRS Validation Approach

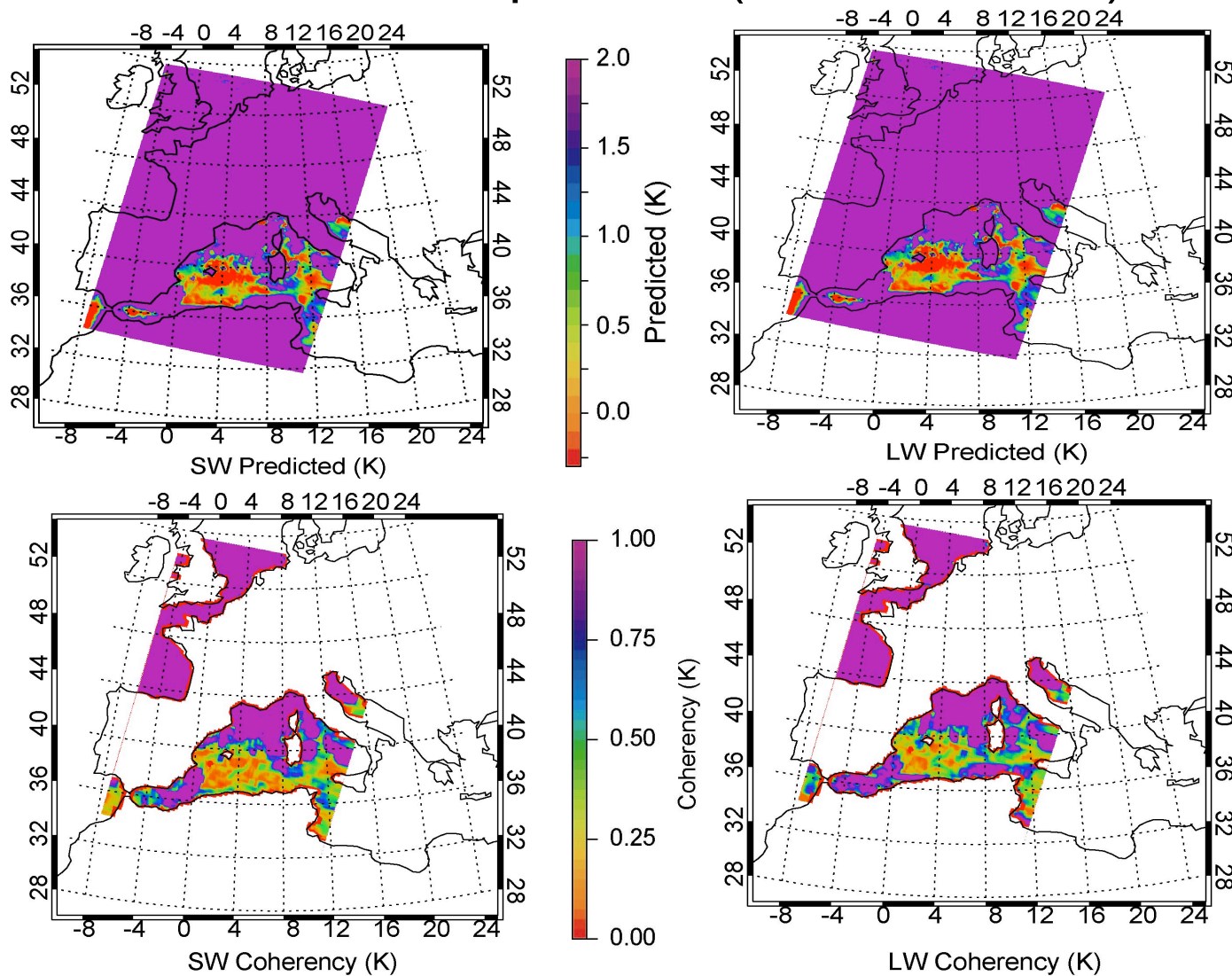
- Identify clear-sky, nighttime ocean conditions
 - *Clear discriminants are now incorporated into the AIRS data products*
- Become familiar with any associated correlative data sets.
- Compare with retrieved quantities
- *Move on to more complex physical conditions:*
 - *Increasing cloud amount*
 - *Land sites*
 - *Daytime*

Clear Discriminant Intercomparison (Evan Fishbein)

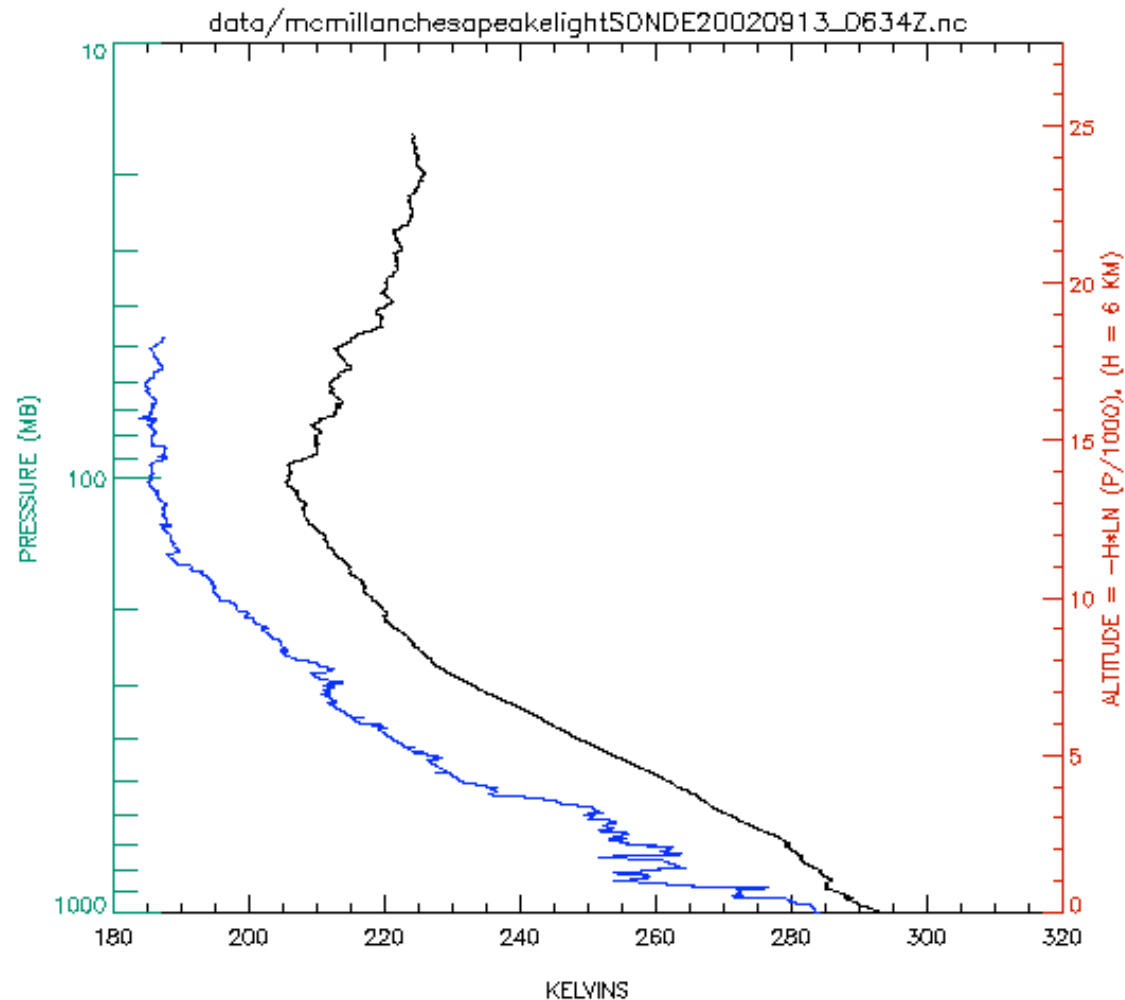
2002 October 15

Granule 17

Descending Night



A Case Study: Chesapeake Platform, 13 September: 'Severe Clear,' no lidar-detected clouds; T and T_{dewpoint}

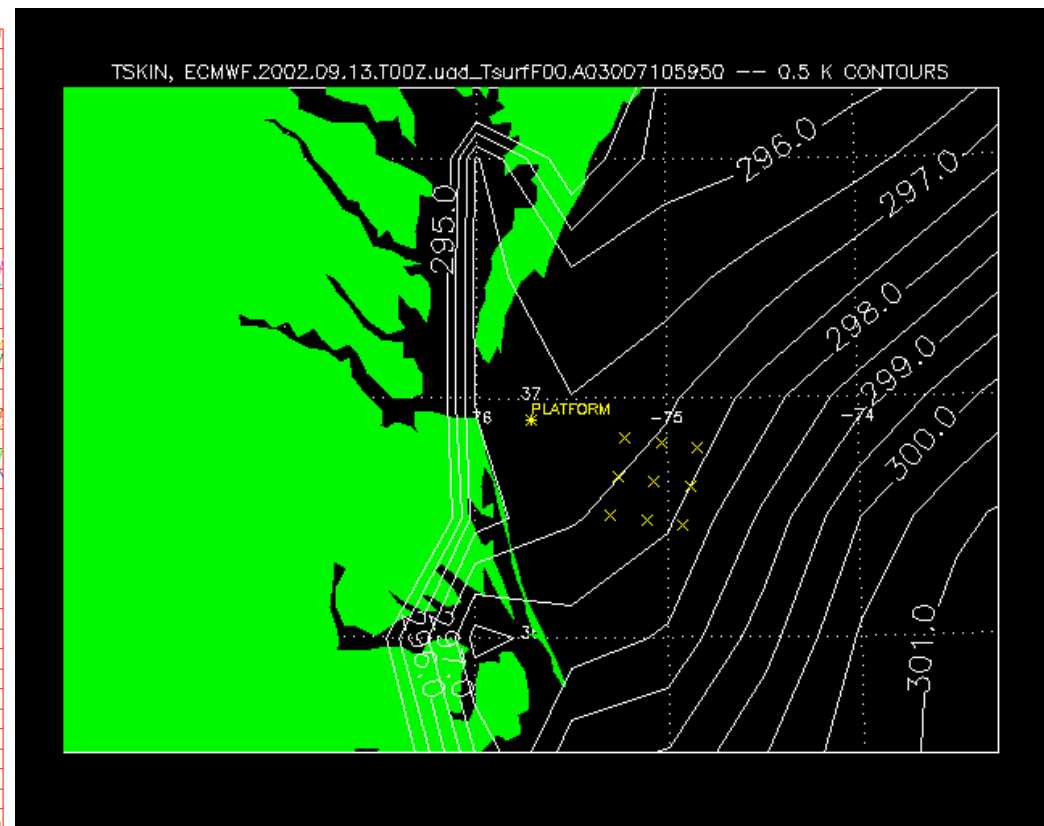
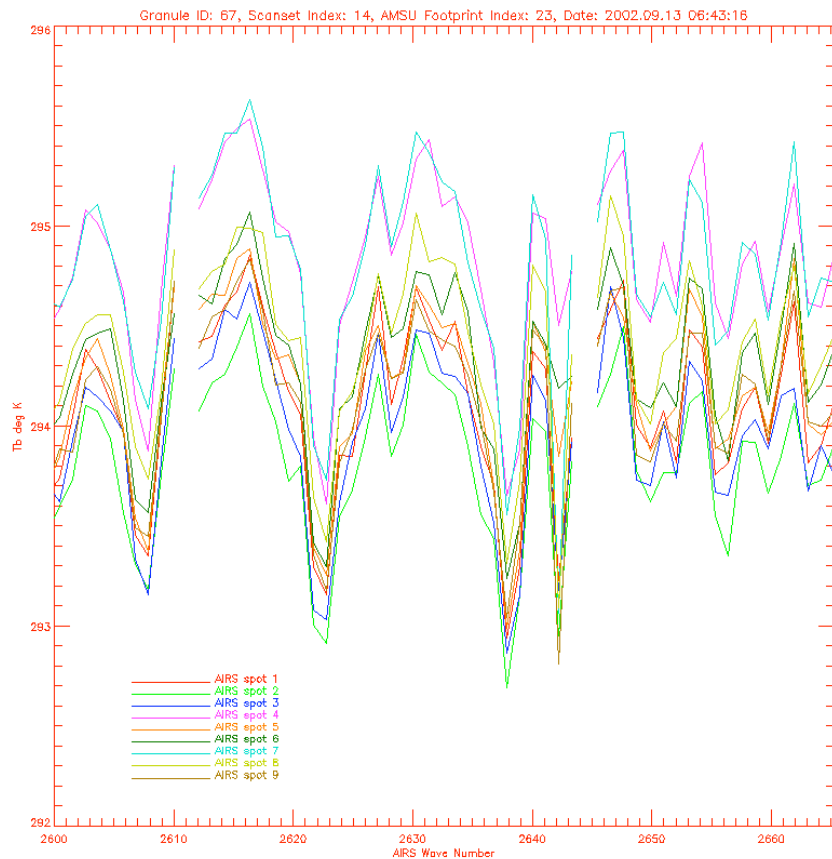


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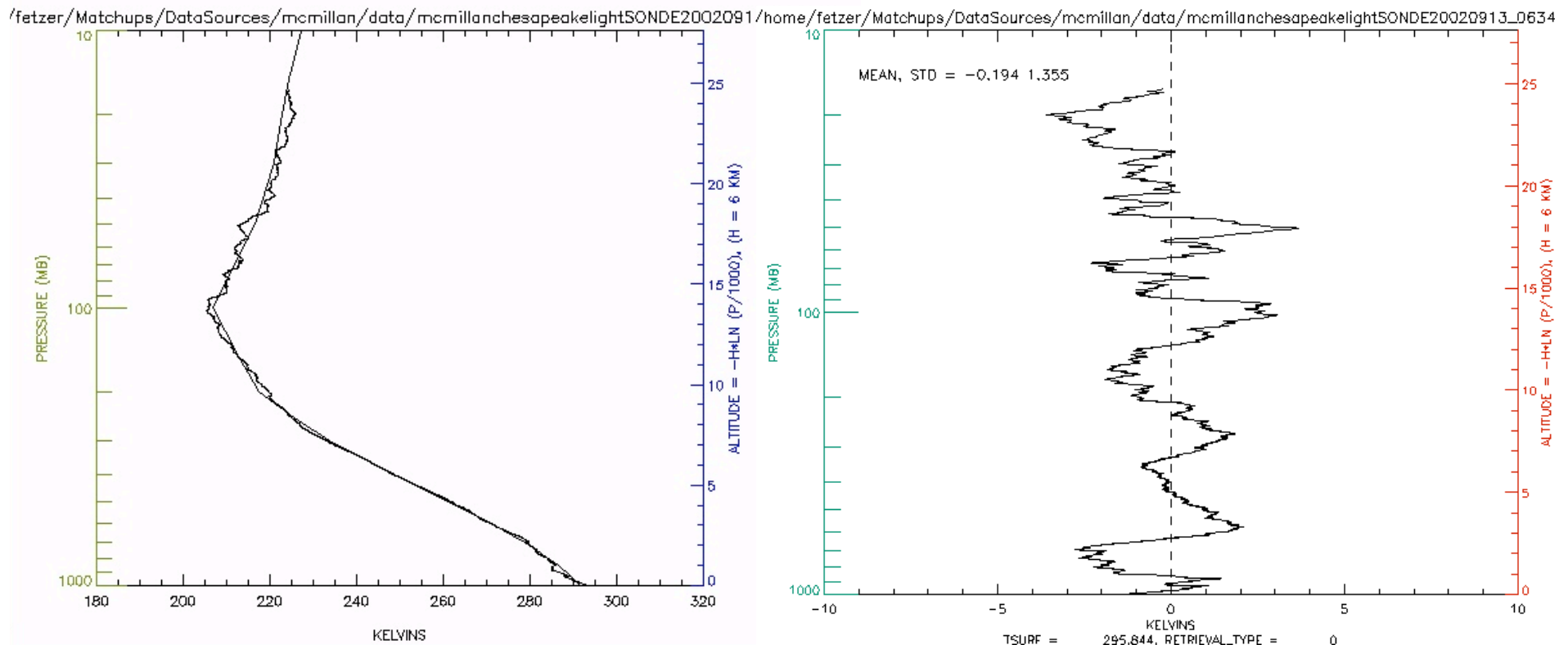
AIRS Shortwave IR T_B (at X's), and ECMWF SST

AIRS 2600-2670 cm^{-1} , plot range = 292-296 K

ECMWF skin SST



First temperature retrievals look good (NOTE: All oceanic retrievals within 100 km look similar)

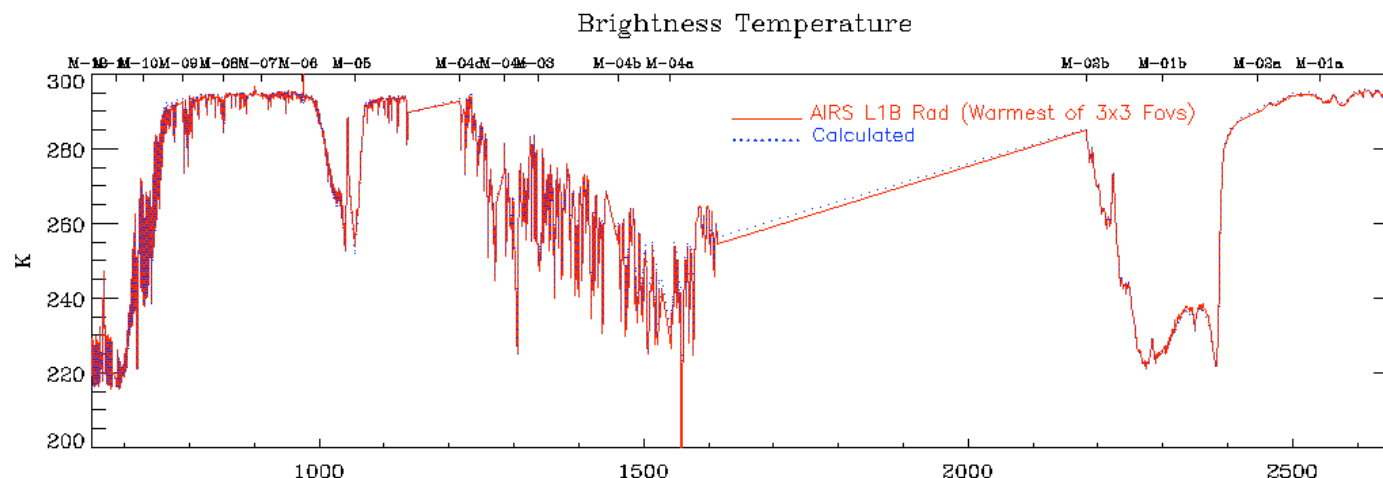


Sonde and AIRS Retrieved

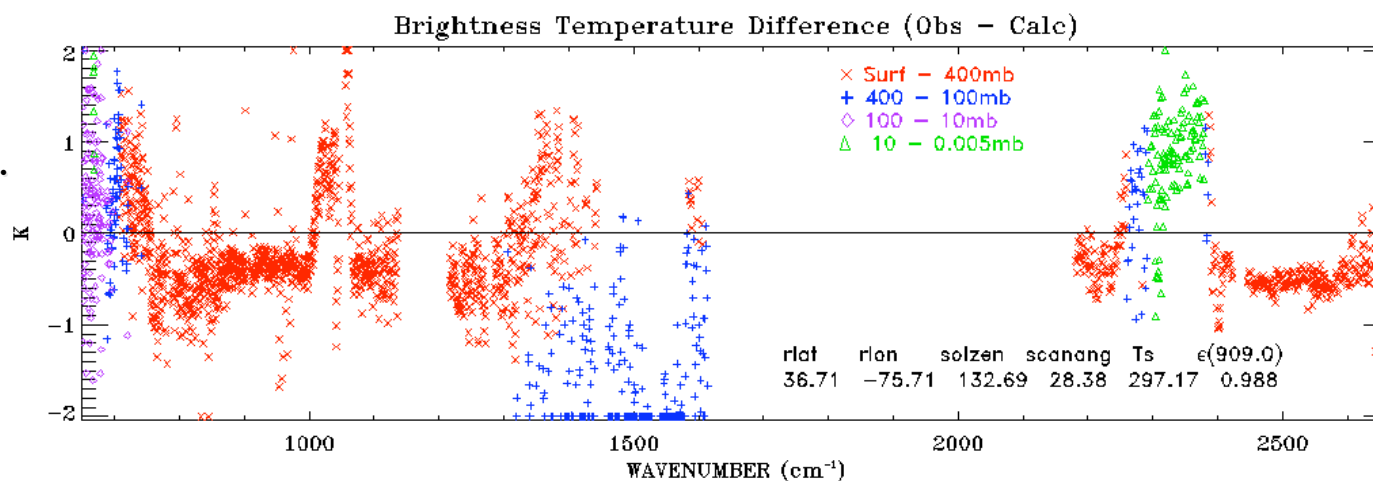
Difference at Sonde Resolution

AIRS Spectrum and Obs - Calc Chesapeake Platform, Sept. 13

AIRS Spectrum

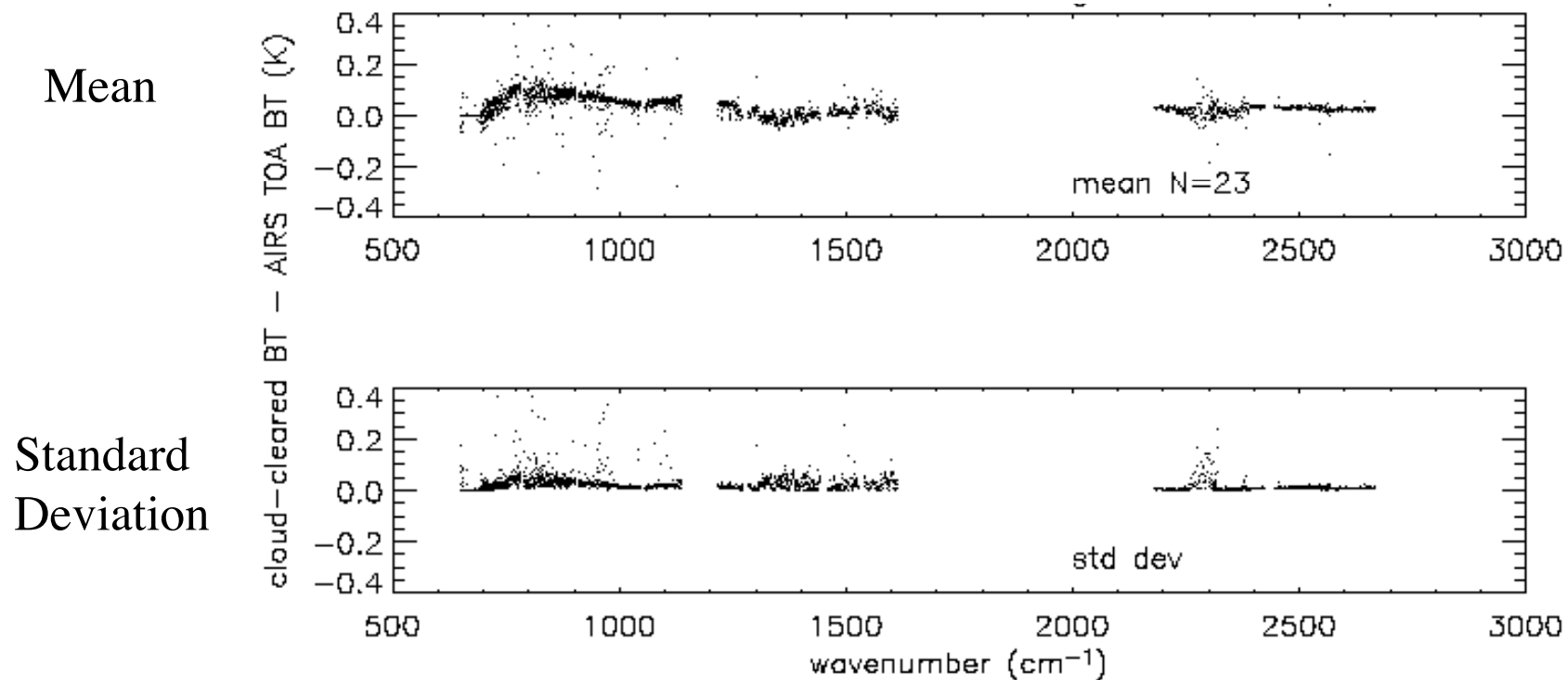


Difference; 'Calc'
from ABOVE sonde.
Color-coded by
weighting function
peak.



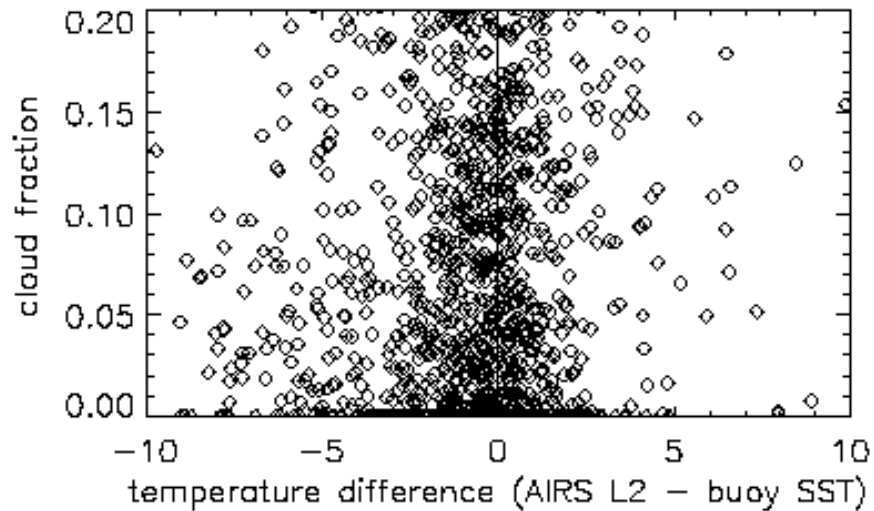
Denise Hagan: Sept 6 retrieved cloud-cleared radiance minus TOA AIRS rad. *Very Clear, ± 20 degrees lat.*

Confirmation that cloud clearing works for clear scenes

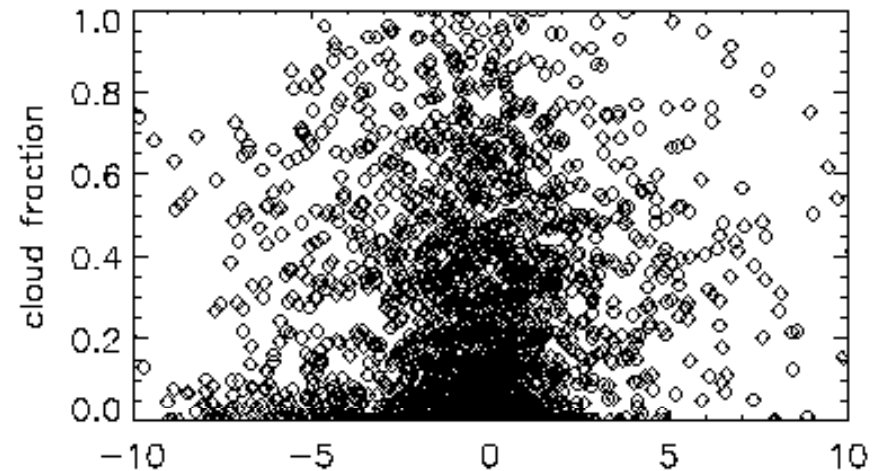


Denise Hagan: Sept. 6 *Standard Product* SST minus ocean buoys. *All Cloud States, day and night*

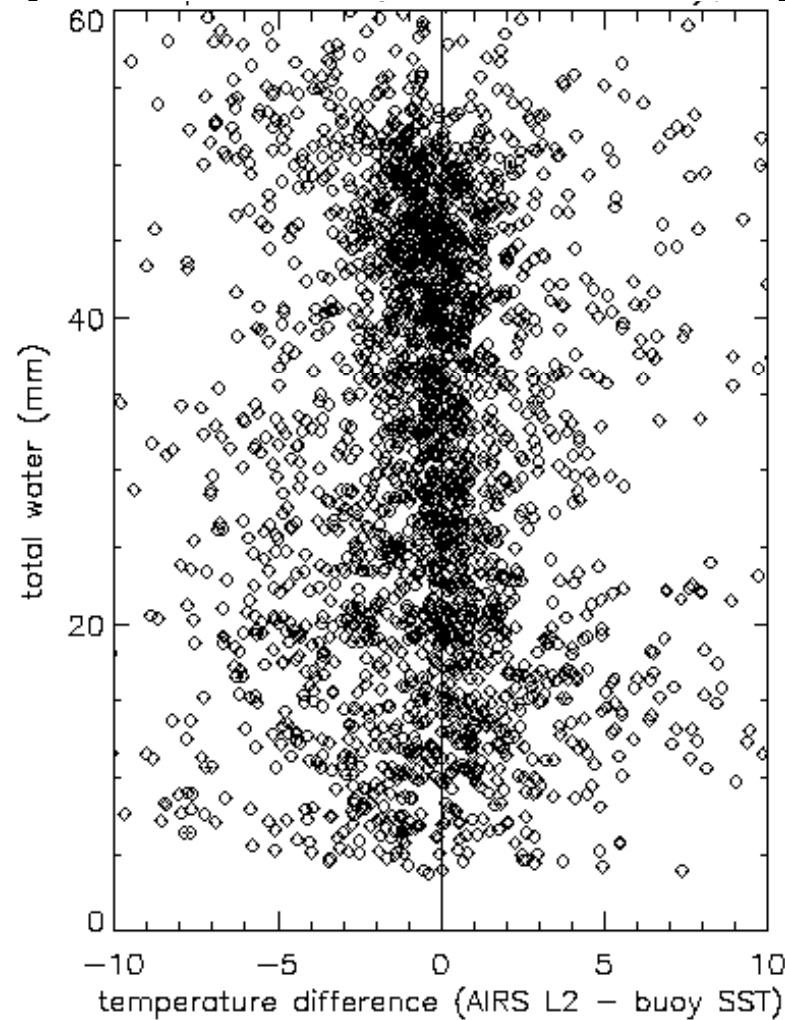
Cloud fractions <20%



All cloud fractions



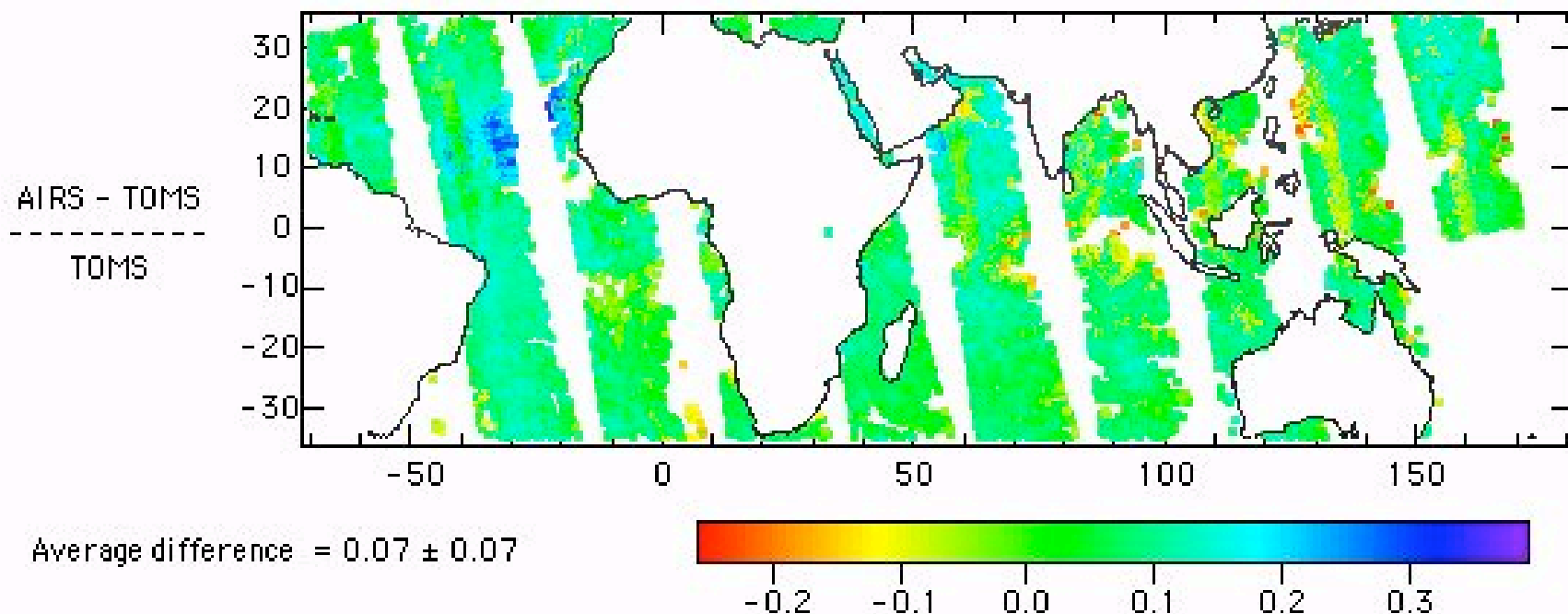
Denise Hagan: Sept, 6 Standard Product SST minus
ocean buoys. *Versus Total Water, day and night*



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Bill Irion: Sept. 6 AIRS Ozone minus TOMS ozone (daytime only)

Average fraction error is 0.07; AIRS ozone retrieval is affected by Saharan dust, high clouds, and sun glint.



Summary

- We have received many, high quality correlative observations from the AIRS validation investigators
- We will publish a Validation Report in May summarizing our state of knowledge.
- Many of the analyses for the report are completed and have been presented at this and earlier meetings.